HODGKIN-HUXLEY MODEL FOR ACTION POTENTIAL: MEMRISTIVE CHARACTERISTICS

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Memristor, a short for memory resistor, is the fourth ideal circuit element whose value varies as a function of charge that has passed through the device. Voltage-gated ion channels in biological membranes share this characteristic of a memristor. In 1952, Hodgkin and Huxley (H-H) developed an electrical circuit model (HH model) to describe the time-dependent action potentials mediated by voltage-gated ion channels. We investigate the dependence of the action potential, including the onset of repeated spiking, on the applied current *I*, sodium and potassium channel conductance, and the membrane capacitance. We use a MATLAB code with the fourth-order Runge-Kutta method to solve the HH equations. Our results suggest that the memristive characteristics of the ion channels can be tuned over a wide range of parameters.

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